

## He 'farms' the wind--and shows others how

**Robert Franklin**

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WOODSTOCK, MINN. -- When Dan Juhl built his shop and office, the local electric cooperative said it would cost \$7,500 to run a power line to the building.

No thanks, Juhl said. For \$1,000 less, he installed a system that powers and heats the 2,100-square-foot structure with wind, sun, batteries and corn -- with no outside line and no monthly electric bills.

Not surprising, perhaps. Juhl is in the business of selling electricity, not buying it.

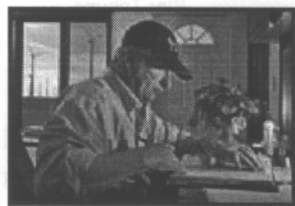
He runs a "farm" of 17 big wind generators outside Woodstock, a Pipestone County town of 132 people. He teaches others how to farm the wind and designs self-sufficient energy projects for homes and businesses. And he maintains machinery for some of the 450 windmills that march across 50 miles of the Buffalo Ridge formation in southwestern Minnesota.



Wind farmer Dan Juhl operates 17 generators in southwestern Minnesota.

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Juhl is acknowledged as a pioneer in a business that has changed the landscape around towns such as Lake Benton and Ruthton, has brought tourism to the region and has put cash into small towns and farmers' pockets.



Dan Juhl works in his office

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For more than 25 years, he has worked with wind generation. He is a throwback to the alternative-energy environmentalists of the 1970s, saying, "I've always been a very true believer."

But he's also looking ahead to what wind can do for family farmers at a time when long-term stability looks elusive.

"Farmers are desperately looking for ways to diversify," he said. "Wind energy is a cash crop," one that's not tied to the vagaries of weather, volatile markets or the price of gasoline and fertilizer.

## Combines in the sky

In many ways, he said, "farming wind is like farming any other cash crop. The main difference is the combines are 200 feet in the air."

Most of Minnesota's wind generators aren't owned by farmers but by corporations such as GE (General Electric) Wind, which recently bought out Enron's interest, and FPL (Florida Power & Light). They may pay farmers as little as \$2,000 a year to lease an acre or less for wind machines.



Juhl's office-shop building is dwarfed by his nearby wind generators.

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Juhl sees his job as helping farmers become owners, and he said he has 14 projects lined up this year. That means helping arrange financing, permits and construction for 28 generators. Plus contracts for power sales -- usually to Twin Cities-based Xcel Energy, which buys enough Minnesota wind-generated electricity each year to replace nearly 3,800 railroad cars full of coal.

Two 950-kilowatt wind generators, Juhl's usual farm installation, cost about \$1.7 million to build, he said, and most of the financing comes from large companies that can use federal tax credits (1.8 cents per kilowatt hour) on wind energy sales.

For the farmer/owner, a generator may net \$30,000 a year after debt service, Juhl said, and after a decade, when the debt is paid off, that can rise to \$100,000 a year.

He said that generators are reliable as long as they're maintained properly -- and farmers are used to maintaining machinery. "You can produce a commodity that everybody uses. . . . It's a great deal."



A view of Dan Juhl's wind farm.

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### Ran out of money

It's been a good deal for Juhl, too, but not an easy one.

He grew up in Crookston, Minn., and attended a year of electronics school. After Vietnam service, he moved to Alaska and played guitar in a rock band, but ran out of money and got a job in a music store.

He gave guitar lessons to the son of an entrepreneur and joined the father in refurbishing wind generators for people living far from power lines.

In 1978, he and his wife, Mary, moved back to her hometown of Kennedy, Minn. There they started Lake State Systems, building small wind generators for farmers. He sold Lake State in 1984 to a Danish

company that hired him as a technical liaison for California wind farms.

But he got tired of traveling, and they started their present company, DanMar & Associates, in 1989. It grosses about \$1.5 million a year, he said.

"It hasn't been easy. . . . Mary and I and the boys were living on soup cans for a while," Juhl said. "Most of my career I didn't have any big companies behind me."

He does some big-company work now, however. DanMar maintains about 50 generators for Edison Capital, a California firm.

He also designs houses and commercial buildings that are energy self-sufficient. "You can build the cost into the mortgage," he said. "The payments are less than your energy bill. The technology is here."

At his headquarters at the Woodstock wind farm, the technology includes a little one-kilowatt (1,000-watt) wind generator, 500 watts of solar power and batteries with four to five days of storage. They run lights, fans, computers and power tools. He also has a solar-powered compost toilet, a corn-burning stove in the office and thermal heat from the ground in the shop.

### **Still a small piece**

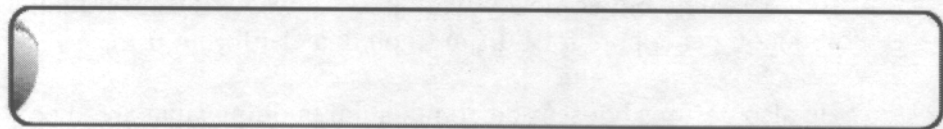
Wind power remains a small part of energy generation -- 1 to 2 percent of Xcel's power, for instance -- and it has been at the center of questions about predictability, taxes and costs. For instance:

- The wind doesn't blow all the time, despite one farmer's joke that you won't find anybody having a good hair day in her town. Wind turbines by themselves can't meet demand, said Jim Alders, Xcel's manager of regulatory administration. "Twenty percent of the time, no electricity is being produced."
- Nevertheless, wind generates so much electricity in southwestern Minnesota that power lines can't carry it all away. Xcel is seeking state approval for additional transmission lines, and a decision is expected by the end of summer.
- Some counties put a temporary moratorium on new generators last winter because of a precipitous drop in property tax revenue from them. The effort was led by Jim Nichols of Lake Benton, a DanMar maintenance worker who is a Lincoln County commissioner and a former state senator. The moratoriums were lifted after the Legislature allowed counties to negotiate a production tax to replace declining property taxes.
- Despite the federal tax credit, cash flow costs for wind energy remain

higher than for other power sources. But that doesn't count the costs of emissions and waste storage or, as Juhl says, "a pricetag on the environment and your children's future."

Besides, the three-bladed wind generators are "graceful, mesmerizing," he said. "I'd rather see a gently turning windmill than a power plant spewing 'goodies' out of the smokestack."

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